

REMARKS

Claims 5-86 are currently pending in the present application; claims 1-4 having been canceled without prejudice or disclaimer.

Claims 21, 38, 55, 64 and 73 were amended to recite the group of elements in a more traditional Markush format. These amendments are made simply to clarify the subject matter and do not affect the scope of the amended claims.

Claims 84-86 are new. Claim 84 recites the additives of independent claim 55 but does not include maleic acid and maleate among the additives; and claims 85-86 recite the same subject matter of claims 82-83 but depend on claim 84. It is respectfully submitted that no new matter issues have been raised by these amendments and added claims. Entry of the amendment is respectfully solicited.

ALLOWABLE SUBJECT MATTER

Applicant appreciates the indication that claims 5-20, 22-37, 39-54 and 56-82 are considered allowable. Accordingly, rejected claims 21, 38, 55 and 83 are under consideration as well as new claims 84-86 and the following remarks relate to these claims.

REJECTION UNDER 35 USC 103

Claims 21, 38, 55 and 83 were rejected under 35 U.S.C. § 103(a) as unpatentable over Heisei 10-227755 in view of Aoyama (U.S. 5,424,204). The rejection is traversed and it is respectfully submitted that claims 21, 38, 55 and 83-86 are patentable within the meaning of 35 U.S.C. § 103(a).

Independent claim 21 relates to a method for stabilizing glucose dehydrogenase for use in glucose sensors. The method includes adding at least one additive to glucose dehydrogenase whose coenzyme is pyrrolo-quinoline quinone wherein the additive is selected from a group which includes maleic acid and a maleate.

Independent claim 38 relates to a glucose dehydrogenase composition for use in glucose sensors. The composition contains glucose dehydrogenase whose coenzyme is pyrrolo-quinoline quinone and at least one additive selected from a group that includes maleic acid and a maleate.

Independent claim 55 relates to a glucose sensor. The sensor comprises a reaction layer, which contains glucose dehydrogenase whose coenzyme is pyrrolo-quinoline quinone and at least one additive selected from a group that includes maleic acid and a maleate. Dependent claim 84 does not recite maleic acid and a maleate among the list of additives. Dependent claims 85-86 further define claim 84.

It should be noted that the above referenced subject matter relates to glucose sensors and their compositions. The recited enzyme is used to detect, directly or indirectly, the presence of glucose in a sample.

In contrast, Aoyama teaches methods for stabilizing glucose 6-phosphate dehydrogenase. This enzyme is used to oxidize glucose 6-phosphate. (See column 1, lines 15-27). It does so in the presence of a coenzyme known as nicotinamide adenine dinucleotide (rather than pyrrolo-quinoline quinone, as recited in

independent claims 21, 38, and 55). Hence, Aoyama is directed to a completely different enzyme.

In the Office Action, the Examiner argued that Aoyama discloses that maleic acid is known for stabilizing glucose dehydrogenase. Applicant respectfully disagrees with this contention.

Aoyama teaches stabilizing glucose 6-phosphate dehydrogenase with hydroxylamines and/or aldehyde scavengers. These compounds are shown on column 2 of Aoyama as Formula I or Formula II. Aoyama further teaches that either the hydroxylamine or aldehyde scavenger can be in a salt form. Examples of such salts are disclosed on column 3, lines 30-36. In this paragraph, Aoyama discloses that a hydroxylamine or an aldehyde scavenger can be combined with an organic acid salt, such as a maleate. Aoyama does not teach the use of maleate alone. Thus, one of ordinary skill in the art would not come to the conclusion that maleate could be used to stabilize a glucose dehydrogenase (let alone the particular enzyme recited in the instant claims under consideration) since Aoyama teaches that stabilization occurs from either the hydroxylamine of Formula I or the aldehyde scavenger of Formula II. Given this specific teaching, there is no reason why one of ordinary skill would have been motivated to use maleate or maleic acid separate and apart from the hydroxylamine or aldehyde scavenger of Aoyama. Following the teachings of Aoyama does not lead one skilled in the art to the claimed subject matter. Accordingly, Applicant respectfully submits that the combination of Aoyama with Heisei is improper.

In the Office Action, the Examiner argues that it would have been obvious to one of ordinary skill in the art to choose maleic acid or maleate from among the list of additives disclosed by Heisei in order to optimize glucose sensor. Applicant respectfully disagrees.

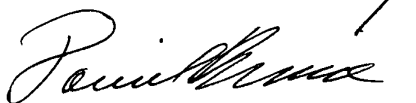
As noted in the Yoshioka Declaration, submitted in Applicant's response of April 21, 2003, one of ordinary skill in the art would not have been motivated to select maleic acid or an anhydride thereof (or any of the other monomers) as a hydrophilic polymer. The disclosure of Heisei is more than just wrong. It does not suggest the use of these low molecular weight compounds. To support this contention Applicant submitted the Declaration of Toshihiko Yoshioka. Applicant respectfully submits that the Yoshioka Declaration is more than mere opinion. The Declaration is one of ordinary skill in the art. The Declaration is also by an author of the Heisei reference. Notwithstanding the above, Applicant respectfully submits that one of ordinary skill in the art would not have been motivated to use a low molecular weight compound, such as maleic acid, in place of a polymer as taught by Heisei.

Moreover, the Heisei reference and the Aoyama reference relate to two different types of enzymes from each other. There is no reason why one of ordinary skill in the art would have modified the Heisei reference as the Examiner contends. Aoyama teaches the use of a hydroxylamine or aldehyde scavenger and a different enzyme. Applicant respectfully submits that one of ordinary skill in the art would not have arrived at the claimed subject matter based on the combined teachings of Heisei and Aoyama without impermissibly relying on Applicant's disclosure as a template.

Based on the foregoing, Applicant respectfully submits that claims 21 and 38 are patentable over the cited art. Reconsideration and withdrawal of the rejection of these claims are respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Daniel Bucca', with a long horizontal stroke extending to the right.

Daniel Bucca, Ph.D.
Registration No. 42,368

600 13th Street, N.W.
Washington, DC 20005-3096
(202) 756-8000 DB:ajb
Facsimile: (202) 756-8087
Date: 8 August 2003